Space Weather Forecast

Issued on Thursday, 29 December 2022 at 12:57 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Minor Geomagnetic Storms later Day 1 into Day 2 (29-30 Dec). Chance of Moderate-class X-ray flares throughout.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Moderate over the past 24 hours with a long period flare originating from over the NE limb, peaking at 29/0729 UTC. There are now nine sunspot groups on the disc, with three new regions developing over the period. The region in the northwest has shown activity during its transit across the disc, but is now rotating off the disc and is difficult to see clearly. Regions in the northeast and southeast are the two largest regions on the disc, but neither are showing much complexity at present. All other regions appear to be small and simple.
No Earth directed Coronal Mass Ejections (CMEs) were observed in available imagery during the period.

Solar Wind / Geomagnetic Activity: Solar winds showed a waning coronal hole fast wind. Wind speed was at slightly elevated levels throughout, easing slightly from around 460 km/s to near 420 km/s. The Interplanetary Magnetic Field has been weak, with the north-south component also fluctuating weakly. The resulting geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: No solar radiation storms were observed, with energetic particle count rates at background levels.

Four-Day Space Weather Forecast Summary
Solar Activity: Solar activity is expected to be Low with a chance of isolated Moderate-class flares. Although the region in the northwest is expected to depart the Earth-facing disc through the next couple of days, this is likely to be counteracted by arrivals across the eastern limb.

Solar Wind / Geomagnetic Activity: A CME may give a glancing blow at Earth on 29th December, although this is low confidence. Solar wind speeds are currently slightly elevated. A coronal hole fast wind is expected to arrive either later on Day 1 (29 Dec) or early on Day 2 (30 Dec). Elevated, or potentially Strong, solar wind speeds are then likely to persist through much of the period, before gradually declining on Day 4 (01 Jan).
Geomagnetic activity is expected to be largely Quiet to Unsettled at first, becoming Unsettled to Active later on Day 1 into Day 2, with a chance of G1/Minor Storm intervals. This is due to the onset of the fast wind, perhaps coupled with the above CME. Geomagnetic activity and the risk of G1 should reduce through Days 3 and 4 (31 Dec - 01 Jan), as the fast wind influence slowly eases.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, however there is a slight chance of an increase in energetic particles to the S1/Minor Storm level, should any larger flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	50	40	10	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	40	40	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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